

LEDs AND IDA

By Peter Strasser

Pete supervises the International Dark-Sky Association, an educational, environmental 501 (c) (3) nonprofit, is dedicated to protecting and preserving the nighttime environment and our heritage of dark skies through quality outdoor lighting. With over 11,000 members in more than 70 countries, IDA is considered the leading authority concerning the problems and solutions related to light pollution.

For years, we have been hearing about the promise of LEDs and the profound impact they will have on the lighting industry, the cost savings they represent in lowered power consumption, and the resultant positive effect they will have on the environment. This change in technology is to be as revolutionary to lighting as was the Edison lamp itself. Predictions abound; research is prolific; and the time to commercial implementation has been reduced from ten years to as few as one. The International Dark-Sky Association (IDA) is keenly aware of and interested in the substantial benefit LEDs can bring to quality lighting and to the reduction of light pollution.

IDA has always felt that good design is a key solution to light pollution problems, and we expect the use of LEDs to improve dark sky visibility. The very nature of LED technology today, in both design and efficacy levels, means that all light emitted must be put to use. Nothing can be squandered. Contrast that to contemporary output sources, and it is easy to see that with LEDs, we do not have the problem of waste. For our concerns, waste is defined as light that shines above the horizontal and has no purpose.

Another aspect of LED luminaire technology not available with HID devices is the virtually unlimited amount of controllability. LEDs can be dimmed to any amount, allowing sophisticated control of luminaires not available with contemporary lamps. Occupancy presence, curfew dimming, and changes in cyclical lunar ambiance are just some of the simple, yet highly desirable functions LED technology promises. Together, the potential fiscal and energy savings will continue to push applications and research rapidly forward. The mandates of California's Title 24 are just the beginning.

Actually, it is happening now. There are installations already in place: BetaLed, IntenCity, Leotek, Philips, and others have LED luminaires lighting up parking lots and roadways with their pleasing, cool white light – a light favored over sodium lamps by anyone who experiences it. We must mention visual efficiency correction factors and lumen equivalence. Quite simply, bluer white light is seen as brighter than spectra leaning towards red. Less power consumption and decreased lumen density, coupled with humans perceiving an area as better illuminated, is a formula that encourages widespread installation.

A potential stumbling block in utilizing LED luminaires is the rapid change in technology... for the better. The conundrum is this: Why install a luminaire with a 5-year warranty when 18 months later something with twice the performance will become the current state of the art? Early adopters may become scarce. The need to coax or subsidize—or willingly endure an expense for the sake of emerging technology—could become necessary to ramp-up cost effective economies of scale.

These rapid changes in technology are producing products that are surpassing U.S. Department of Energy (DOE) expectations, much to the delectation of IDA. Goals and projected efficacy levels are consistently beaten. The Energy Star label criteria are being set and are now thought to be achievable by early 2008, some two years faster than projected. For a time, highly publicized breakthrough bench test lumen per watt levels were seen on nearly a daily basis, but without any industry standards. The DOE is now trying to level the field and standardize the units. Manufacturers are agreeing to comply.

LED-driven lighting is expected to be of superior efficacy and efficiency; however, we must be careful to avoid the notion of high efficiency as the ultimate goal. It's important not to stroll down Efficiency Lane and by default grant approval to any improvement. A bad luminaire design that is wonderfully efficient is still a bad design. A solar powered glare bomb is still a glare bomb. We also need to make sure that fledgling LED equipped luminaires, those with exquisite lumen control out of the need to aim every photon, don't become more wasteful with the anticipated improvements in efficacy and devolve into contemporary bad design.

We eagerly await solid state lighting's forthcoming technology. It could well be a major step in solving the problem of light pollution. This may seem overly ambitious, but the nature of good design, the reduction in lighting levels in lumen equivalence, and the increasing costs – both monetary and environmental – will help encourage reduction of light pollution's waste. And as that happens, the beauty of the night's celestial sphere will once again be available to everyone, everywhere.

IMSA